This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

U F
643
A6
3in B
1917

UC-NRLF
$B 74 095

YC 64333

GIFT OF

SIGILLVM · VNIVERSITATIS · CALIFORNIENSIS
FIAT LVX
MDCCCLXVIII

EX LIBRIS

No. 1701

INSTRUCTIONS

FOR MOUNTING, USING, AND CARING FOR

3-INCH
15-PDR. BARBETTE CARRIAGE

MODEL OF 1903

(*THREE PLATES*)

JANUARY 30, 1907
REVISED JUNE 10, 1909
REVISED JANUARY 16, 1911
REVISED MAY 8, 1916

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

No. 1701

U.S. Ordnance dept.

INSTRUCTIONS

FOR MOUNTING, USING, AND CARING FOR

3-INCH
15-PDR. BARBETTE CARRIAGE

MODEL OF 1903

(*THREE PLATES*)

JANUARY 30, 1907
REVISED JUNE 10, 1909
REVISED JANUARY 16, 1911
REVISED MAY 8, 1916

UNIV. OF
CALIFORNIA

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

UF643
A6
3in B
1917

L.C.

List of plates to accompany instructions for mounting, using, and caring for 3-inch 15-pdr. barbette carriage, model of 1903.

Plate.		Class.	Division.	Drawing.
I	Left side and rear view	5	15	2
II	Right side and plan view	5	15	3
III	Cradle and details	5	15	6

365275

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
Washington, May 8, 1916.

This manual is published for the information and government of the Regular Army and Organized Militia of the United States.

By order of the Secretary of War:

WILLIAM CROZIER,
Brigadier General, Chief of Ordnance.

UNIV. OF CALIFORNIA

INSTRUCTIONS FOR MOUNTING, USING, AND CARING FOR 3-INCH 15 PDR. BARBETTE CARRIAGE, MODEL OF 1903.

(THREE PLATES.)

GENERAL DESCRIPTION.

(The parts printed in *italics* should be specially noted. The important changes are shown in **boldface type.**)

Principal Parts.—The carriage is of the pedestal-mount type and its principal parts are: Pedestal, pivot yoke, cradle, traversing and elevating mechanism, shield and shield supports, peep and telescopic sight, firing mechanism, shoulder rests, and electrical attachments.

Pedestal.—The pedestal is made of cast steel, and has the general form of the frustum of a cone united at its top to a cylindrical section and at its bottom to a base, in the flange of which are drilled holes for the fourteen foundation bolts and three leveling screws. Two handholes covered with water-tight plates are provided for cleaning the interior. The joints of the covers are made water-tight by means of Garlock's gasket packing. There are twelve holes equally spaced for the foundation bolts, and two extra holes drilled so as to enable the use of this pedestal in emplacements of the 15-pounder barbette carriage, model of 1902.

The exterior of the cylindrical part is finished and forms a seat for the traversing worm wheel. Beneath this seat on the front of the pedestal is a boss to which the friction band is secured by a stud bolt. An annular boss is cast in the bottom of the pedestal. This boss is bushed with bronze and forms a bearing for the lower end of the pivot yoke. The upper interior cylindrical part of the pedestal is also bushed with a bronze bearing. These two bearings serve to keep the pivot yoke in a vertical position. The weight of the revolving parts is supported by a ball thrust bearing inserted between the end of the pivot yoke and the bottom of the cylindrical recess formed by the annular boss at the bottom of the base of the pedestal.

Pivot Yoke.—The pivot yoke is of cast steel, and has a cored conical stem from which rise two vertical cheeks. In the cheeks are bronze-lined trunnion beds for the trunnions of the cradle. These beds are fitted with interchangeable dovetailed cap-squares bolted to the cheeks. Finished recesses are formed in the outer faces of the cheeks of the pivot yoke into which the shield supports are fitted and bolted. There is an annular projection under the cheeks of the pivot yoke to which is bolted a cover to protect the traversing worm wheel. The cored holes in the stem of the pivot yoke are closed with plugs to prevent the entry of water into the bearings of the pedestal. The rear faces of the cheeks are finished so as to receive a bracket containing the traversing and elevating mechanisms. This bracket is bolted to the rear faces of the cheeks by six bolts. There are oil holes provided in the pivot yoke for oiling its upper bearings in the pedestal, and an oil pipe leading from a hole to the thrust bearing through the cored hole in the pivot yoke enables that bearing to be flooded with oil.

CRADLE.—The cradle, of cast steel, has a cylindrical body bored out to receive the counter-recoil spring, and recoil cylinder, on the upper surface of which are guides, lined with bronze, for the recoil clips of the gun.

Two side pieces extending upward from the cradle body have trunnions which fit in the bronze-lined trunnion beds in the pivot yoke. The outer end of the right trunnion is finished to receive the front-sight bracket.

Pads near the rear end of the cradle, on either side, are finished for the shoulder guards, and on the right side for the rear-sight bracket; on the left for the range drum gear segment. The right side of the cradle at the rear end has a boss finished with a vertical hole to receive the semiautomatic breech mechanism when used.

At the bottom part of the rear end of the spring cylinder is a lug to which is attached the inner elevating screw.

The counter-recoil spring is a single helical spring, with round cross section, and at assembled height it is about 12 inches shorter than at free height. It is assembled from the front, and the rear end rests against a flange on the interior of the spring cylinder and the forward end rests against a flange on the front recoil-cylinder head. The counter-recoil spring is coiled between the interior of the spring cylinder and the exterior of the recoil cylinder.

The recoil cylinder is of forged steel, finished all over, and threaded at the ends to receive the front and rear recoil-cylinder heads. There are flexible vulcanized fiber packings making oil-tight the front and rear ends of the recoil cylinder. The piston rod passes through a stuffing box in the front recoil-cylinder head.

The stuffing box consists of a finished bronze follower on the piston rod, screwed into a box in the front recoil-cylinder head, and compressing five rings of Garlock's hydraulic waterproof packing between a flange in the box and a forged-steel gland, divided in two halves and retained in position on the follower by a spring-steel ring.

The front cylinder head is provided with filling and drain holes, each to be closed by a bronze washer-head filling and drain plug.

The spring cylinder head is of cast steel and receives the piston-rod pull. It also receives the thrust of the counter-recoil spring at assembled height,when the lug of the gun is disconnected from the rear cylinder-head stud, in mounting and dismounting the recoil system. The instruction plate is mounted on the right side of the pivot yoke.

The piston rod and piston is in one piece, made of forged steel, finished to receive a bronze piston liner and bored out to receive the counter-recoil buffer. This buffer is made of bronze, finished so as to be screwed into the rear recoil-cylinder head from the inside.

There are three throttling grooves in the interior of the recoil cylinder.

RECOIL AND COUNTER-RECOIL SYSTEMS.—The action of the gun is as follows: When fired, the gun recoils to the rear about 9 inches in the cradle, carrying with it the recoil cylinder, and thereby compressing the counter-recoil spring. A small portion of the energy of recoil is taken up in compressing the counter-recoil spring, but the greater portion of the energy is absorbed by the resistance offered by the liquid being forced through the orifices of the throttling grooves. The width of the grooves is uniform, but their depths are proportioned, so that the areas of the orifices vary with the position of the piston during recoil and will be such as to give, with the aid of the counter-recoil springs, a constant resistance throughout the length of recoil. The counter-recoil buffer is tapered so that the escape of oil during counter recoil through the varying diametral clearances between the buffer and the walls of its hole will offer such resistance as will control the motion of the gun during its return, and finally bring it to rest when the recoil piston reaches the rear end of the cylinder.

ELEVATING MECHANISM.—The elevating mechanism consists of a handwheel actuating through suitable connecting shafts and bevel gears, a double screw with right-hand outer threads and left-hand inner threads. The outer elevating screw is of forged steel and turns in a bronze elevating nut and cap. It receives its rotary motion from the elevating bevel gear by means of two keys sliding in longitudinal grooves cut in the outside of the screw. The inner screw has a left-hand thread and has its upper end attached to the lug on the bottom of the rear end of the spring cylinder. The elevating-screw nut is pivoted on trunnions so as to allow the necessary rotation, corresponding to different angles of elevation. The elevating-screw nut is provided with an elevating-screw nut cap bolted to it by four bolts. The elevating-screw cap has an oil hole and plug, and the elevating-screw nut has a hole fitted with a plug for draining.

The elevating bevel gear is of bronze, and the pinion is of forged steel. The pinion is keyed onto the elevating intermediate shaft, which receives its motion from the handwheel by the elevating handwheel shaft and a set of elevating handwheel shaft gears inclosed in gear covers.

The elevating handwheel shaft has a bearing near the handwheel in a bracket secured to the shoulder rest. The elevating-gear bracket cap has a bearing for the lower end of the elevating handwheel shaft and serves as a cap for the trunnions of the elevating-screw nut.

TRAVERSING MECHANISM.—The traversing mechanism consists of the traversing wormwheel, traversing worm shaft and worm, one pair of bevel gears, one traversing shaft, and one traversing handwheel. The traversing wormwheel is seated on the exterior cylindrical top of the pedestal, and is retained in position by the friction band, a shoulder on the pivot yoke, and a shoulder on the pedestal.

The friction band is made in halves and united by a stud bolt screwed into a boss on the front of the pedestal. By means of a bolt a certain amount of friction, between the friction band and the traversing wormwheel, secures the traversing wormwheel to the pedestal rigidly enough to allow the thrust of the traversing worm shaft to traverse the gun, but it does not secure it so rigidly that the teeth of the traversing wormwheel might be injured by the sudden shock of discharge.

There is a spring between the bolthead and the lug on the friction band, so that when the bolt is tightened enough to give sufficient friction to enable the gun to be traversed without slipping, it will yet permit slipping in case undue strain is brought on the teeth of the wormwheel. The traversing worm shaft is assembled with its worm in the traversing-gear case in the elevating-gear bracket.

A pair of bevel gears, in a cast-iron bevel-gear cover, serve to transmit the motion of the traversing handwheel and traversing handwheel shaft to the end of the traversing worm shaft. The traversing handwheel shaft is supported in its proper position by two brackets containing suitable bearings. One bracket is bolted to the elevating-gear bracket and the other is bolted to the shoulder rest.

SHOULDER GUARDS.—Bronze shoulder guards are attached one on each side of the cradle. They carry the firing mechanism and protect the gunners from injury during recoil and counter recoil of the gun.

SIGHT.—The rear-sight bracket is bolted to the right face of the rear end of the cradle and the front-sight bracket is bolted to the end of the right trunnion of the cradle. The top of the rear-sight bracket contains the sight shank, elevating pinion and wormwheel, worm shaft and worm, range drum, and handwheel. The front-sight bracket is provided with trunnion beds and caps for the trunnions of the sight fulcrum. The sight cradle, fulcrum, and front-sight bracket are constructed so as to allow the sight both horizontal and vertical rotation for deflection and elevation.

The upper end of the sight shank is provided with a deflection worm actuated by a knurled knob on the left end of the shaft. The sight cradle, which carries the peep and telescopic sights, is supported near its rear end by the sight shank. There is a rack attached to the cradle by which the latter can be moved in azimuth by turning the knurled worm knob.

The rear face of the sight shank has a 16-degree elevation scale, graduated to six minutes, or 0.10 of a degree, and the periphery of the range drum is graduated in yards. The sight has a movement in azimuth of 5 degrees, the central position being at the 3-degree mark. The deflection scale is graduated to six minutes, or 0.10 of a degree. Electric lamps are provided for illuminating the graduated scales and the cross wires.

RANGE DRUM.—A drum is attached to the left side of the carriage, which is graduated to ranges in yards and elevation in degrees. A pinion on the drum engages in a rack attached to the cradle; the movement of the rack when the gun is elevated or depressed turns the drum through the pinion. A spiral spring on the interior of the drum is provided to take up the back lash in the rack and pinion:

The peep sight consists of a tube bracket with a peephole at the rear, and a ring carrying two intersecting blades at the front.

SHIELD AND SUPPORTS.—The shield consists of a 2-inch nickel-steel plate bent to shape, shielding the gun and detachment from the front only. The shield is supported by two shield supports bolted to the pivot yoke.

The center of gravity of the weight of the shield, supports, pivot yoke, gun, and charge is so arranged that it falls through the center of the ball thrust bearing in the pedestal, thus limiting as much as possible the force necessary to elevate and traverse the gun.

ELECTRICAL EQUIPMENT.—The necessary electricity is supplied for lighting the graduated scales and cross wires through a cable passing up through the base of the pedestal to a 360-degree sliding contact on the stem of the pivot yoke. **A portable lamp and plug box are also furnished.**

The contact clips, of the 360-degree sliding contact, rub on the two insulated rings mounted on the stem of the pivot yoke. These contact rings are connected with the lamps by lead-covered cables passing up through the cored center of the pivot yoke and through a hole above the upper bearing of the pivot yoke to the junction box on the outside.

A snap switch is provided for turning on and off the electricity. From the junction box to the lamps the current passes through cables inclosed in waterproof conduits. The contact bracket is bolted to the annular lug in the center of the base of the pedestal and supports the supply cable and the two contact clips with their proper insulation so that the clips make a 360-degree sliding contact with the contact rings.

SHOULDER RESTS.—The carriage is provided with shoulder rests bolted to the pivot yoke on each side.

TO ASSEMBLE THE CARRIAGE.

The following description refers particularly to the order in which the parts should be assembled:

In assembling the carriage, see that all match figures on pieces correspond with each other. All numbers on the bolts should correspond with the numbers alongside the holes in which they fit. The tables in this pamphlet give the marking, name, location, material, and the number of all parts, and should be consulted.

All of the machined parts, including the joints, keys, bolts, bolt holes, and working parts, should be thoroughly cleaned (with fine emery cloth if necessary) and oiled before being assembled.

On the arrival of a carriage at a fortification, the emplacement will have been prepared for the carriage by the setting of a bed of concrete with the foundation bolts in place. The pedestal, with the leveling thrust plates in position, is set on the concrete bed with the lettered side to the front, and by the use of the thrust plates and leveling screws the pedestal is accurately leveled by placing a sensitive spirit level across the finished top of the pedestal in all directions.

After the pedestal is accurately leveled, the foundation bolts are tightened and the pedestal is fixed in position by a grouting of neat Portland cement and the leveling screws backed off. The ball thrust bearing is then placed on its bearing in the pedestal. The traversing wormwheel, with the spring friction band on it, is dropped over the upper part of the pedestal so that the hinge stud bolt passes through its hole in the spring friction band.

The pivot yoke is then prepared for entering, by being properly cleaned and all burrs removed. The bearing parts should be well lubricated and the pivot yoke then lowered into position in the pedestal. The traversing worm shaft and bearings are assembled in the elevating gear bracket, which is then bolted to the pivot yoke, care being taken that the threads of the worm mesh with the teeth of the traversing wormwheel and that the teeth are not burred. The bevel gear, outer and inner elevating screws, the elevating-screw nut, and the elevating-screw nut cap are assembled and the trunnions of the elevating-screw nut are secured in the trunnion beds of the elevating gear bracket by bolting the elevating gear bracket cap in place over the trunnions of the elevating-screw nut. The shoulder rests are now bolted in place and the traversing and elevating shaft mechanism assembled. The inner and outer elevating screws should be turned down until each is within one thread of being completely home.

The cradle is now placed in position and the upper end of the inner elevating screw connected with the lug on the lower part of the rear end of the spring cylinder.

The bearing surfaces of the guides in the cradle and the clips of the gun are carefully examined. See that all burrs and rust are removed and that the surfaces are carefully oiled.

The cradle being elevated to horizontal, the gun is placed in position from the rear until it comes to within 14 inches of its proper position in the battery. The gun is now blocked to prevent going any farther into battery. The counter-recoil spring is placed in position in the spring cylinder. The front and rear recoil-cylinder heads having been assembled to the recoil cylinder with the piston rod in position, the recoil cylinder is then placed in position inside the counter-recoil spring and the spring compressor is attached. The counter-recoil spring is compressed by screwing up the nut against the lug of the gun until the rear recoil-cylinder head projects 0.25 inch through the spring cylinder and the front recoil-cylinder head is far enough inside the cradle to allow the spring cylinder head to be screwed into the spring cylinder. The nut on the spring compressor may now be slacked off, and the thrust of the counter-recoil spring against the front recoil-cylinder head will be taken by the spring-cylinder head. The block may now be taken out, the spring compressor removed, and the gun pushed completely into battery, and the rear cylinder-head stud connected with the lug of the gun, taking care that the filling and drain plugs are in their proper position. A split pin is placed in the end of the stud to prevent accidental unscrewing of the nut.

The shield supports, with the shield attached, are now bolted to the pivot yoke. The left shoulder guard, with the firing rod and left firing handle bracket assembled, is bolted to the cradle, the right shoulder guard, with the right firing handle bracket assembled, is placed in position, clamped, by means of the clamp nut, to the left shoulder guard, then bolted to cradle and firing handle shaft, rocker arm and firing handle assembled.

The range drum case is now bolted to left shoulder rest, and gear segment to cradle, and drum shaft and mechanism assembled. The sight brackets are also bolted to the cradle. The electric wiring may then be completed.

Important Points.—After the carriage has been completely assembled and the gun mounted, the following points should be noted:

1. See that the recoil cylinder is full of oil.
2. See that the stuffing box is tight.
3. See that all bearing surfaces are clean and well oiled.
4. See that the cap-squares are properly bolted down.
5. Try carefully the traversing and elevating mechanisms.
6. At all times handle the sight with care.
7. See that the front recoil-cylinder head does not touch the spring cylinder head when the gun is completely in battery.
8. Adjust carefully the friction band on the traversing wormwheel [so that when the carriage is rapidly traversed and suddenly stopped the traversing band will slip].
9. Adjust the inner and outer elevating screws so that, at maximum elevation allowed by the carriage, all but one thread of the inner screw is completely housed in the outer elevating screw and the top of the outer elevating screw is one thread above the top of the elevating screw cap nut.
10. Examine the entire carriage and see that all assembling bolts are screwed up to their proper bearings. Do not use too much force in bringing the bolts to their proper bearings, as the bolts may be overstrained.

CARE OF THE CARRIAGE.

General Instructions.—Carriages should be maneuvered from time to time through their complete range of azimuth and elevation. It is especially required that all parts of the carriage be kept free from rust *at all times*. If the rust be allowed to accumulate, its removal from all bearing parts, and especially the piston rod and interior of the recoil cylinder, requires particular attention in order that clearances shall not be unduly increased. The use of sandpaper for this purpose is forbidden, and emery cloth, No. 1, being coarse enough for any ordinary rusting, should be used, the rust being softened, if necessary, by kerosene.

If any leakage occurs from the hydraulic recoil system, it should be immediately remedied, calling, if necessary, upon the district armament officer for the services of skilled labor.

The repacking of stuffing boxes may be done, when necessary, by trained enlisted men under the supervision of an officer, but will preferably be done by skilled labor.

Before removing a cylinder head containing a stuffing box, or drawing a piston rod through a stuffing box, the pressure of the packing on the piston rod should be released by unscrewing the follower several turns.

The flexible vulcanized-fiber gaskets between the recoil-cylinder heads and the cylinder should be in good condition, and consequently should be replaced whenever necessary in order to prevent leakage.

The recoil cylinder should be emptied at least every three months and thoroughly cleaned every six months.

INSTRUCTIONS FOR EMPTYING AND FILLING THE RECOIL CYLINDER.—In emptying the recoil cylinder the following order of operations should be followed:

(*a*) Take out split pin and remove piston-rod nut.

(*b*) Remove the spring-cylinder head.

(*c*) Depress gun 5 degrees.

(*d*) **Remove the drain and filling plugs and allow the oil to thoroughly drain out.**

In filling the recoil cylinder, the cylinder should be completely filled with oil and, after being filled, one-half pint of oil should be removed. The filling plug, spring cylinder head, piston rod nut, and split pin should then be replaced.

INSTRUCTIONS FOR CLEANING THE RECOIL CYLINDER.—For this cleaning a plumber's hand force pump is issued by the Ordnance Department to each artillery post. In cleaning, the following order of operations should be followed:

(*a*) Take out the split pin and remove the nut from the stud on the rear recoil-cylinder head.

(*b*) Back off the gun to about 14 inches in rear of its normal position in battery and secure it in this position by a block between the lug of the gun and the face of the spring cylinder, and lash the gun securely to the shield supports so that when the gun is elevated it will not slide off to the rear.

(*c*) Couple the spring compressor to the stud on the rear recoil-cylinder head and put the rear recoil-cylinder head nut on the spring compressor and tighten up on the nut until the cylinder head is seen to start to the rear.

(*d*) Take out the split pin and remove the piston-rod nut and spring-cylinder head.

(*e*) Slack off on the counter-recoil spring by unscrewing the rear recoil-cylinder head nut so as to allow the cylinder to pass out of its housing to the front. At the same time give the gun sufficient elevation to allow the removal of the cylinder and counter-recoil spring to the front through the port in the shield. *Great care must be taken to prevent the spring compressor and the recoil cylinder from turning while the counter-recoil spring is being slacked off. If the spring-compressor nut should come off, the force of the spring is sufficient to do considerable damage.*

(*f*) When the counter-recoil spring is free take off the spring-compressor nut from the rear cylinder-head stud and remove first the recoil cylinder and then the counter-recoil spring.

(*g*) Take out the filling and drain plugs and drain the oil from the recoil cylinder.

(*h*) Slack off three turns of the follower of the stuffing box and unscrew the front cylinder head from the recoil cylinder and remove the piston from the recoil cylinder.

(*i*) Carefully clean all parts of the recoil mechanism, *taking great care that no emery dust is left on any part of the recoil mechanism.* Flush the interior of the recess in the piston rod for the counter-recoil buffer and also flush the interior of the recoil cylinder with kerosene oil by means of the plumber's hand force pump, so as to wash out any dirt, grit, sand, or emery powder that may be present.

(*j*) Replace the piston and front cylinder head in the recoil cylinder with the piston in the normal position. Replace the filling and drain plugs.

(*k*) Replace the counter-recoil spring and the recoil cylinder, couple the spring compressor to the rear recoil-cylinder head and compress the spring by means of the rear recoil-cylinder head nut until the rear recoil-cylinder head is seen to project slightly in rear of the packing ring at the rear part of the spring cylinder. Replace the spring-cylinder head and slack off on the rear recoil-cylinder head nut until the spring-cylinder head takes the thrust of the spring.

(*l*) Bring the gun to zero degrees elevation, remove the spring compressor, and return the gun in battery and replace the rear recoil-cylinder head nut and split pin, taking care to see that the filling and drain plugs are in their proper positions.

(*m*) Take off the spring-cylinder head, remove the filling plug, and fill the recoil cylinder, **as prescribed on preceding page.** Tighten the follower of the stuffing box. Replace the spring-cylinder head, piston-rod nut, and split pin.

(*n*) Retract the gun to normal recoil, 9 inches, and allow the gun to return into battery at maximum elevation and note whether the action is entirely normal.

TO PACK OR REPACK A STUFFING BOX.—To pack a stuffing box, after drawing the oil from the cylinders, remove the follower and the gland and all of the packing in the box. Examine all of the old packing and discard all unfit for use. If any of the old packing is used it should be put in after the new.

To repack, put one ring of 0.5-inch Garlock's waterproof hydraulic packing on the piston rod and force it well to the bottom of the stuffing box by a wooden stick and mallet. Treat each layer of packing in a similar manner, being careful to break the joints, until five rings of new packing have been inserted or an equal amount of new and old when any of the old is used. Place the halves of the gland on the follower, put the small retaining spring in position to hold the halves of the gland in position on the follower, put the follower with the gland on the piston rod and push the gland into the stuffing box. Screw up the follower, being careful to note that halves of the gland do not bind on the screw threads.

No more force than that of one man should be used to tighten the follower.

The follower should be tightened from time to time. If the follower be screwed into the stuffing box too tightly, an unnecessary amount of friction will be produced on the rod. When the follower is screwed in until the flange strikes the box another ring of packing should be inserted or the box repacked.

It is expected that a slight amount of oil will soak through and drip from the stuffing boxes of carriages when not in use. In tightening the follower, a slight amount of oil will be squeezed out of the standard packing.

Service Conditions (Lubrication, etc.).—When the carriage is to be kept in readiness for service and in daily or frequent use, all bearing parts must be kept thoroughly cleaned and lubricated. Especial attention should be given to lubricating trunnion beds, bearing surfaces, guides, shaft bearings, sliding surfaces, elevating and traversing mechanisms, including the teeth of all gears.

The above-mentioned parts, and especially all parts where oil holes are provided, should be lubricated at frequent intervals whether the carriage is maneuvered or not. When carriages are in use for daily drills a thorough lubrication twice a week should be sufficient for all but the most severely used parts.

If the carriage is to remain unused for a time all unpainted surfaces should be coated with a *thin* coating of slushing oil. It can be applied as in painting, using sash tools, No. 6, except in cold weather it should be applied by stippling, i. e., light tapping, with the brush held perpendicular to the surface to be covered.

Should it rain within thirty hours after its application, all surfaces should be carefully examined and recoated if necessary. *In all cases it should be applied in a thin coat, as this is all that is needed to give good protection.*

This oil is easily removed by burlap or waste dipped in kerosene oil. In order to save oil, a thick coating of slush oil should be well removed with a scraper before applying the kerosene. Before applying the slushing oil the surfaces should be thoroughly cleaned, so as to be entirely free from rust, kerosene oil, water, and lubricating oil, as the first three would cause rusting underneath and the latter would run off when heated.

Experience has shown that the recoil cylinders should not be left empty, as in that case the interior walls soon become dry and rusty.

Oil Holes.—Oil holes, where provided, must be cleaned out frequently to keep them free from grit. *The oil holes will be habitually kept closed, except when in the act of oiling. Before oiling at any oil hole, wipe off any dirt or grit near the opening that might be carried down into the bearing by the oil.*

Oils.—**Oils for lubricating are provided and should be used as indicated in Ordnance Pamphlet No. 1869.**

Kerosene oil is issued by the Ordnance Department for cleaning purposes only.

A special grade of neutral oil called "hydroline," having a specific gravity of about 0.85, is furnished for filling the recoil cylinders.

The different kinds of oil, etc., will be kept in receptacles plainly marked with their contents, and the soldiers should be carefully instructed in the use of the several kinds of oil, etc., and should be taught to distinguish one from another.

Oils must always be kept in closed receptacles to prevent contamination by water, dirt, etc.

Oils which have been used for any purpose must never be used again without being filtered or carefully strained. They should never be returned to the receptacles containing the new oil.

A suitable receptacle should be kept by each battery in which hydroline oil from cylinders can be placed and allowed to stand undisturbed until all sediment in it has settled. In removing the oil from this receptacle great care should always be taken that none of the sediment is included in the oil removed. Mere discoloration does not affect the serviceability of the oil.

Tables of supplies used for the above purposes are published from time to time by the Ordnance Department.

Painting, etc.—In general three coats of paint will be given to a carriage the first year; two coats thereafter annually will suffice, the actual needs depending somewhat upon the climate and local conditions. Before painting, surfaces should be rubbed smooth and made perfectly clean and dry. As soon as the carriage is completely assembled and the piece mounted, all parts which have been marred in transportation will be primed, after which one complete coat of olive paint will be applied.

All steel nonbearing surfaces, both inside and out, will be painted. This includes the exposed parts of shafts and large bronze pieces, including the shoulder guard, the web and spokes of wheels, and cylinder heads.

All wearing or bearing surfaces, including the handles of handwheels, are not painted. The follower of the stuffing box and all scales will not be painted, but will be kept clean and polished with **material furnished for this purpose.**

The raised surfaces of letters and the rims of the instruction and name plates are to be kept clean and bright; the remaining surfaces of these plates will be painted the same color as the carriage. The instruction plates will not be removed from the carriage when painting.

The paints mentioned above will be furnished in original packages mixed and ready for use. In all cases before using the contents of the package it should be thoroughly stirred with a wooden paddle, and if thinning is desired, linseed oil **or turpentine** is used.

TO REMOVE OLD PAINT FROM GUNS AND CARRIAGES.—When the paint becomes so thick as to scale off in places or present an unsightly appearance, as will happen after a number of coats have been applied to guns and carriages, it will be removed for painting as follows:

Dissolve 1 pound of concentrated lye, powdered form, in 6 pints of hot water and slake in enough lime to give the solution the consistency of paint. Use the solution freshly mixed and apply to parts where paint is to be removed. It may be applied with waste tied on the end of a stick, but is preferably applied with a brush. When the solution begins to dry on the surface, use a scraper to remove the old paint and complete the cleaning of the surface with a mop and water. If one application is not sufficient to loosen the paint, apply a second coat. Before applying the new coat of paint wash the surface with liquid made by dissolving 8 ounces of washing soda in 8 quarts of water and wipe dry. Let stand a sufficient length of time to have all parts thoroughly dry before painting.

For further information regarding paints, oils, cleaning materials, and methods of using same, see Ordnance Department pamphlet, Form 1869.

LIST OF ARTICLES PACKED IN THE ARMAMENT CHEST FOR 3-INCH 15-POUNDER GUN, MODEL OF 1903.

(Articles marked * are carried loose in the chest.)

No.	Piece mark.		
1	U47BC	Quire emery cloth, No. 00.	
1	U47AC	Bronze drift, large.	
1	U47AB	Bronze drift, small.	
3	U47AW	Files, pillar, No. 6, 6-inch,	For use on bruised breechlocks. No other files to be used thereon.
3	U47AV	Files, 3-cornered, No. 4, 6-inch,	
3	U47AU	Files, half-round, smooth, 8-inch,	
3	U47AT	Files, round, smooth, 8-inch,	
1	U47AR	File, flat, dead smooth, 8-inch.	
1	U47AS	File, round, second cut, 8-inch.	
1	U47AU	File, half-round, smooth, 8-inch.	
1	U47BH	File, 3-cornered, 8-inch.	
1	U47AM	**Hammer, boilermaker's or machinist's.**	
1	U47AG	Copper hammer.	
*1	**U196C**	Gunner's lanyard.	
1	U47AN	Hand mallet.	
1	U47AP	Long-handled mallet.	
1	U47AQ	Pair cutting pliers, 7-inch.	
*1	....	Gunner's pouch.	
1	U47AE	Metal scraper (for removing paint).	
*1	....	Pair gunner's sleeves.	
*3	U47AX	Wagon sponges.	
*4	U47AY	Balls twine, assorted.	
*10	U47AZ	Pounds cotton waste.	
*2	U47BA	Pounds copper wire, No. 12.	
*2	U47BB	Pounds copper wire, No. 16.	

LIST OF ARTICLES PACKED IN THE ARMAMENT CHEST FOR 3-INCH 15-POUNDER BARBETTE CARRIAGE, MODEL OF 1903.

(Articles marked * are carried loose in the chest.)

No.	Piece mark.	
1	U46Q	Filling funnel.
1	**U46J**	Oiler, half-pint.
*1	**U46L**	Oiler, locomotive, 1 quart.
1	U45AN	Screw driver, commercial, 3-inch blade.
1	U45AE	Screw driver, commercial, 5-inch blade.
1	U43C	Double wrench for 0.375-inch and 0.5-inch nuts.
1	U43F	Double wrench for 0.625-inch and 0.75-inch nuts.
1	U43H	Double wrench for 1-inch and 1.25-inch nuts.
1	U43FB	Double wrench for 1.5-inch and 1.875-inch nuts.
1	U43M	Double wrench for front and rear recoil cylinder heads and piston rod.
1	U43AP	Single wrench for spring cylinder head and rear recoil cylinder head nut.
1	U44AE	Box wrench for filling and drain plugs.
*1	U55K	Recoil cylinder wrench.
1	U47BK	Recoil spring compressor.
1	U47BP	Recoil spring compressor nut.
*1	U44AV	Spanner wrench for follower.
	U55L	Socket wrench for filling plugs.
2	**U47BD**	**Buckets, water, indurated-fiber.**

LIST OF IMPLEMENTS FURNISHED FOR 3-INCH 15-POUNDER GUN, MODEL OF 1903.

1 sponge and staff.
1 breech cover.
1 combined tompion and muzzle cover.
1 sponge cover.
1 slush brush with handles to connect with special sponge staff.
1 steel scraper and socket to fit special sponge staff.
1 special sponge staff for slush brush and steel scraper.

NAMES OF PARTS OF 3-INCH 15-POUNDER BARBETTE CARRIAGE, MODEL OF 1903, THEIR MARKS, LOCATION, AND THE MATERIAL OF WHICH THEY ARE MADE.

(Alphabetically arranged.)

Marks.	Name of part.	Location.	Material.	No.	Remarks.
4D	Ball thrust bearing	Base of pedestal	Steel	1	0.625 balls used.
7B1	do	Elevating gear bracket	do	2	0.25 balls used.
29K	Bolts, stud	Traversing shaft bearing	do	2	2.156 ($\frac{5}{32}$) x 1.25 split pin.
4S	Bolts, tap	Hand-hole plates to pedestal	do	8	
4N	do	Shield supports to pivot yoke	Forged steel, No. 3	10	Whitworth thread.
5C	do	Shield to shield supports	do	16	Do.
6F	do	Packing ring to cylinder	Steel	6	
7Z	do	Traversing wormwheel cover to pivot yoke	do	6	
9G1	do	Elevating gear bracket to pivot yoke	do	6	
10G	do	Shoulder rest (left) to pivot yoke	do	4	
10D	do	Traversing and elevating handwheel shafts bearing to shoulder rest (left).	do	1	
10H	do	Tube to shoulder rest (left)	do	3	
11B	do	Shoulder guard (left) to cradle	do	4	
16BA	do	Contact bracket to pedestal	do	2	
16F	do	Junction box to pivot yoke	do	2	
16GA	do	Conduit straps to pivot yoke	do	2	
16P	do	do	do	2	
22D	do	Front sight bracket to cradle	do	4	
22G	do	Rear sight bracket to cradle	do	4	
22B	do	Cap to front sight bracket	do	4	
28D	do	Tube to shoulder rest (right)	do	3	
28E	do	Shoulder rest (right) to pivot yoke	do	4	
29B	do	Shoulder guard (right) to cradle	do	4	
31J	do	Range drum case to shoulder rest (left)	do	2	
31N	do	Gear segment to cradle	do	1	
31P	do	do	do	3	
31Q	do	Pointer to range drum case	do	2	
7D	Bolts, through	Friction band	do	1	0.125 steel washer
8A	do	Cap to elevating screw nut	do	2	2 0.156 ($\frac{5}{32}$) x 1.25 split pins.
8B	do	do	do	2	Do.
9D	do	Cap to elevating gear bracket	do	4	4 0.156 ($\frac{5}{32}$) x 1.25 split pins.
9J	do	Elevating gear cover	do	3	3 0.093 ($\frac{3}{32}$) x 0.75 split pins.
10E	do	Traversing and elevating handwheel shafts bearing to shoulder rest (left).	do	1	
29M	do	Traversing gear cover	do	1	1 0.093 ($\frac{3}{32}$) x 1 split pin.
29N	do	do	do	2	2 0.093 ($\frac{3}{32}$) x 1 split pin.
31L	do	Range drum case to shoulder rest (left)	do	1	1 0.156 ($\frac{5}{32}$) x 1.5 split pin.

NAMES OF PARTS OF 3-INCH 15-POUNDER BARBETTE CARRIAGE, MODEL OF 1903, THEIR MARKS, LOCATION, AND THE MATERIAL OF WHICH THEY ARE MADE—Continued.

Marks.	Name of part.	Location.	Material.	No.	Remarks.
32F	Bolts, through	Traversing shaft bearing, upper, to shoulder rest (left).	Steel	2	2 0.156 ($\frac{5}{32}$) 1.5 split pin.
4J	Bolts, washer head	Cap-squares to pivot yoke	do	4	
4T	Bushing	In pedestal	Bronze	1	Forced and finished.
4M	do	do	do	1	Do.
10F	do	Elevating shaft bearing	do	1	Do.
9A	do	Elevating gear bracket cap	do	1	Do.
16FA	do	Junction box cover	Rubber	1	
32D	do	Traversing shaft bearing (upper)	Bronze	1	Do.
16M	Cable hooks	On electric circuit	Wrought iron	1	
16L	Cable thimbles	do	Galvanized iron	1	
22A	Caps	Front sight bracket	Steel	2	
4C	Cap-squares	On trunnions	Cast steel, No. 2	2	
32E	Clamp nut	Firing handle brackets	Bronze	1	
8R	Collar	On elevating handwheel shaft	Steel	1	1 0.208 x 2.5 steel taper pin. 1 0.078 ($\frac{5}{64}$) x 0.437 ($\frac{7}{16}$) split pin.
29H	do	On traversing handwheel shaft	do	2	2 0.208 x 2.5 steel taper pin. 2 0.062 ($\frac{1}{16}$) x 0.375 split pin.
11G	do	Firing rod	Forged steel	1	1 0.162 x 1.5 taper pin. 1 0.062 ($\frac{1}{16}$) x 0.375 split pin.
16N	Conduit straps	On telescopic sight	Steel	2	
16Q	Conduit strap	On electric circuit	do	1	
16FA	do	do	do	2	
16CA	Contact clips	On contact bracket	Spring brass	2	
16Y	Contact ring terminals	Contact ring	Brass	2	
16AA	Contact bracket	On interior boss of pedestal	Cast steel, No. 1	1	
16S	Contact ring insulators	Between contact rings and pivot yoke stem	Molded mica	2	
16T	Contact rings	On stem of pivot yoke	Brass	2	
6B	Contact cables	In interior of pivot yoke	Lead-covered	2	
6B	Counter recoil spring	In spring cylinder	Spring steel	1	See specifications.
6A	Counter recoil buffer	In recoil cylinder	Tobin bronze	1	
16H	Couplings	Terminals and junction boxes	Bronze	3	
16HA	do	On armored conduit	Steel	1	
16B	Cover	Junction box	Cast iron	1	
6L	Cradle liner (right)	On cradle	Bronze, No. 3	1	
6M	Cradle liner (left)	do	do	1	
6T6	Cradle	On pivot yoke	Cast steel, No. 2	1	
22C	Dowel	Front sight bracket	Steel	1	

31D2	Drum clamp	On drum shaft	Bronze	1	2 0.156 ($\frac{5}{32}$) x 1.5 split pins. 2 0.25 sq. key staked in.
31R	do	do	do	1	**Finish.**
31B1	Drum shaft	Range drum case	Cast steel	1	
9B	Elevating gear bracket cap	Elevating gear bracket	Cast steel, No. 1	1	
9C1	Elevating gear bracket	Elevating gear mechanism	Cast steel, No. 2	1	
7V1	Elevating handwheel	Elevating handwheel shaft	Bronze	1	Marked "Depress" and "Elevate."
9H	Elevating handwheel shaft gear cover	Elevating gear bracket	Cast iron	1	In two pieces.
8G	Elevating handwheel shaft gear	Elevating handwheel shaft	Bronze, No. 3	1	
8H	do	Elevating intermediate shaft	Forged steel, No. 2	1	
8F1	Elevating bevel gear	Elevating gear bracket	Bronze, No. 3	1	
8E	Elevating bevel pinion	Elevating intermediate shaft	Forged steel, No. 2	1	16 teeth, 6 per inch.
8N	Elevating pin	End of inner elevating screw	do	1	1 0.25 x 1.5 split pin.
8Q	Elevating intermediate shaft	Elevating screw nut	Forged steel, No. 1	1	1 0.208 x 2.125 steel taper pin. 1 0.078 ($\frac{5}{64}$) x 0.437 ($\frac{7}{16}$) split pin.
8T	Elevating handwheel shaft	Elevating handwheel shaft bearings	Drawn-steel tubing.	1	1 0.25 x 1.125 steel key. 2 0.156 ($\frac{5}{32}$) x 1.25 split pin.
22F	Elevating pointer	Rear sight bracket	German silver	1	
8J1	Elevating screw nut	Elevating gear bracket	Bronze, No. 4	1	0.25 pitch, right-hand, single thread.
8C	Elevating screw nut cap	Elevating screw nut	do	1	
8K	Elevating screw, inner	Outer elevating screw	do	1	0.25 pitch, left-hand, single thread.
8L	Elevating screw, outer	Elevating screw nut	Forged steel, No. 3	1	0.25 pitch, right-hand, single thread.
10J3	Elevating shaft bearing	On shoulder rest (left)	Cast steel	1	1 spring cover No. 1.
4U	Filler piece	Pedestal	Steel	10	In emplacements having 1.375 bolts.
U46Q	Filling funnel	Filling hole, hydraulic cylinder	Copper	1	
32C1	Firing handle	On firing rod	Bronze	1	1.279 x 1.875 taper pin.
32A1	Firing handle bracket (left)	On shoulder guard (left)	do	1	1.093 ($\frac{3}{32}$) x 0.5 split pin.
32B1	Firing handle bracket (right)	On shoulder guard (right)	do	1	
11N1	Firing handle shaft	In firing handle brackets	Forged steel	1	
11D	Firing rod guides	On shoulder guard (left)	Bronze	2	4 0.312 ($\frac{5}{16}$) x 0.625 countersunk bronze rivets.
11E1	Firing rod spring	On firing rod	Spring steel	1	Oil-tempered.
11F4	Firing rod	On firing rod guides	Forged steel	1	1 0.162 x 1.5 taper pin; 1.062 ($\frac{1}{16}$) x 0.375 split pin.
6S1	Follower	Stuffing box	Bronze, No. 3	1	
7C	Friction spring	Friction band bolt	Spring steel	1	
7H	Friction band	On traversing worm wheel	Steel	1	In two pieces.
22N	Front sight bracket	Trunnions of cradle	Cast steel, No. 1	1	
6G	Front recoil cylinder head	Recoil cylinder	Bronze, No. 4	1	
	Garlock gasket packing	Handhole plates		2	Waterproof, 0.25 thick.
31H	Gear segment	Bolted to cradle	Bronze	1	
6R	Gland	Stuffing box	Forged steel	1	In halves.
31S1	**Graduation scale**	**On range drum**	**German silver**	1	
4R	Handhole plates	Handholes in pedestal	Steel	2	
7W3	Handles for handwheels	Elevating and traversing mechanism	**Bronze**	2	
4L2	Instruction plate	Pivot yoke	do	1	
16U	Insulation block	Contact bracket	Molded mica	1	
16E1	Junction box	On pivot yoke	Cast iron	1	
28J	**Junction box shield**	**Pivot yoke**	**Steel**	1	**Bend to suit surface of pivot yoke.**
8D1	Keys	Elevating bevel gear	do	2	

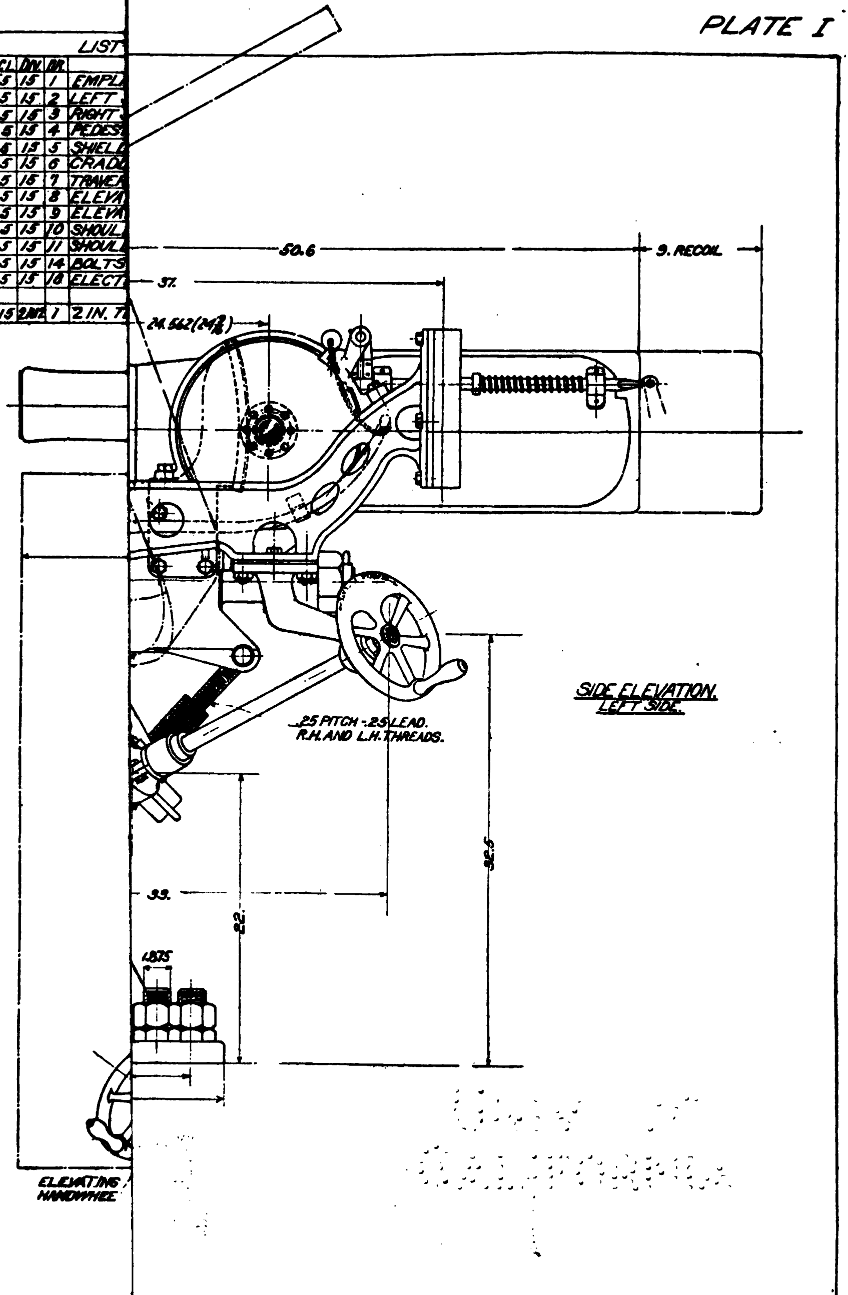
NAMES OF PARTS OF 3-INCH 15-POUNDER BARBETTE CARRIAGE, MODEL OF 1903, THEIR MARKS, LOCATION, AND THE MATERIAL OF WHICH THEY ARE MADE—Continued.

Marks.	Name of part.	Location.	Material.	No.	Remarks.
	Lighting cables	Junction box to lights	Harbirshaw red core wire.	1	Set, No. 14 carrying capacity, 7 strands 0.025 diameter.
4B	Leveling screws	Pedestal	Steel	3	
4A1	Leveling plates	On foundations	do	3	
16G	Nipple	Terminal box	Iron	1	Standard 0.5 close nipple, right-hand pipe thread.
8P	Nut	On elevating intermediate shaft	Steel	1	
8M	do	On elevating handwheel shaft	do	1	Handle end.
8S	do	do	do	1	Bevel gear end.
7E	do	On traversing worm shaft	do	2	
31C1	do	On drum shaft	do	2	
29F	do	Traversing handwheel shaft	do	1	
29G	do	do	do	1	
10B	Nut strip	Shoulder rest (left)	Bronze	1	
28B	do	Shoulder rest (right)	do	1	
U46J	Oil can	For oiling bearings	Brass	1	½ pint capacity.
U46L	Oiler, locomotive	do	do	1	1 quart capacity (carried loose in chest).
6E	Packing ring	Rear end of spring cylinder	Steel	1	With felt washer.
4Q3	Pedestal	On foundation	Cast steel, No. 2	1	
31A1	Pinion	On drum shaft	Bronze	1	21 teeth.
6K	Piston rod liner	On piston	Bronze, No. 4	1	
6H	Piston rod nut	On piston rod	Forged steel, No. 3	1	
6J	Piston and rod	In recoil cylinder	do	1	
4H6	Pivot yoke	On pedestal	Cast steel, No. 2	1	
14A	Plugs, filling, and drain	Front recoil cylinder head	Bronze	4	2 extra 0.062 ($\frac{1}{16}$) copper gasket.
14A	Plugs, drain		do	1	0.062 ($\frac{1}{16}$) copper gasket.
4E	Plug, pivot yoke	Top pivot yoke stem	do	1	
4F	Plug	Bottom pivot yoke stem	Steel	1	
Q3C	Plugs, oil		Bronze	3	
31M1	Pointer	On range drum case	do	1	2 German silver strips.
31E6	Range drum	On drum clamp	do	1	
31K2	Range drum case	On shoulder rest (left)	do	1	
31F1	Range drum spring	On drum clamp	Steel	1	
6P	Rear recoil cylinder head nut	On rear recoil cylinder head	Forged steel, No. 3	1	
6N3	Rear recoil cylinder head	Recoil cylinder	do	1	
22M1	Rear sight bracket (left)	Cradle	Cast steel, No. 1	1	
6D	Recoil cylinder	In spring cylinder	Forged steel, No. 3	1	
U47BK	Recoil spring compressor		Steel	1	
U47BP	Recoil spring compressor nut		do	1	
11Q1	Rocker arm	On firing shaft	Bronze, No. 3	1	1.279 x 1.875 taper pin. 1.093 ($\frac{3}{32}$) x 0.5 split pin.

7AC	Screw	Elev. and trav. handwheel handles	Steel	2	
31T	**Screws**	**On scale**	**German silver**	**38**	**Forced.**
22J	Screw, special countersunk	Rear sight bracket	Steel	1	
4K	Screws, countersunk	Instruction plate	Bronze	2	Riveted over.
28K	**Screws, countersunk**	**Junction box shield**	**Steel**	**5**	
16Z	Screw contracting	In contact ring	Steel	8	
16J	Screws, fillister head	Terminal box	do	2	
16C	do	Junction box cover	do	2	
16R	do	Conduit straps	do	2	
16DA	Screw insulation block	Contact bracket	do	2	
U45AN	Screw-driver	For electrical attachments	do	1	3-inch blade, commercial.
U45AE	do	do	do	1	5-inch blade, commercial.
16X	Screw insulators	Contact ring	Molded mica	8	
5D2	Shield	Supported on shield supports	2-inch nickel steel	1	To conform to printed specifications for this carriage.
5A	Shield support (right)	Bolted to pivot yoke and shield	See specifications	1	
5B	Shield support (left)	do	do	1	
10A3	Shoulder rest (left)	Bolted to pivot yoke	Cast steel, No. 1	1	
11A3	Shoulder guard (left)	Bolted to cradle	Bronze	1	Outside surface buffed.
28A1	Shoulder rest (right)	Bolted to pivot yoke	Cast steel, No. 1	1	
29A2	Shoulder guard (right)	Bolted to cradle	Bronze	1	
22K	Sight shank liner	Rear sight bracket	do	1	
22L	Sight bracket number plates	Front sight bracket	do	2	
16A1	Snap switch	In junction box	**Perkins**	1	**5 amperes, 250 volt, single-pole switch.**
6C1	Spring cylinder head	On spring cylinder	Cast steel, No. 3	1	
6Q1	Spring ring	In stuffing box for gland	Steel	1	
7Y2	Stems	Handles of elevating and traversing handwheels	do	2	
11H	Stop pin	In shoulder guard (left)	do	1	
16V	Terminals	Contact clips	Brass	2	
16K	Terminal box	Sight cradle	Bronze	1	
29C2	Traversing bevel gear	Traversing worm shaft	Bronze, No. 3	1	24 teeth.
29DE	do	Traversing handwheel shaft	Forged steel	1	20 teeth.
29L1	Traversing bevel gear cover	Elevating gear bracket	Cast iron	1	In two pieces.
7P	Traversing gear case bushing (right)	do	Bronze	1	
7Q	Traversing gear case bushing (left)	do	do	1	
7U1	Traversing handwheel	Traversing handwheel shaft	Aluminum alloy	1	Marked "Right" and "Left."
7AA	Traversing wormwheel cover	On pivot yoke	Cast iron	1	In two pieces.
7A	Traversing wormwheel	On pedestal	Bronze, No. 3	1	100 teeth; 5 pitch.
7AB	Traversing worm shaft collar	On traversing worm shaft	Bronze	1	
7F	Traversing worm shaft	In elevating gear bracket	Forged steel, No. 1	1	0.5 pitch and lead, left-hand thread, B. & S. standard.
29J1	Traversing shaft bearing (lower)	Elevating gear bracket	Cast iron	1	1 spring cover No. 1; 1 bronze bushing, forced.
32G	Traversing shaft bearing (upper)	Shoulder rest (right)	Cast steel	1	
4G	Trunnion bed liners	Pivot yoke	Bronze	2	In halves.
10C	Tube	On shoulder rest (left)	Rubber	1	Made without fabric.
28C	do	On shoulder rest (right)	do	1	Do.
4P	Tubing	From oil hole to thrust bearing	Seamless-drawn brass.	1	About 28 inches long.

PLATE I

LIST			
CL.	DIV.	DR.	
5	15	1	EMPL
5	15	2	LEFT
5	15	3	RIGHT
5	15	4	PEDES
5	15	5	SHIEL
5	15	6	CRAD
5	15	7	TRAVE
5	15	8	ELEVA
5	15	9	ELEVA
5	15	10	SHOUL
5	15	11	SHOUL
5	15	14	BOLTS
5	15	18	ELECT
15	2IN.T	1	2 IN. T



'D PERTAINS TO			REVISIONS	
S	DIV.		APRIL 28, 1904	APR. 14, 1909
			JULY 14, 1904	MAY 6, 1909
			AUG. 12, 1904	JAN. 10, 1910
			MAY 1, 1905	MAR. 7, 1910
			JAN. 15, 1906	JUNE 9, 1913
			APR. 30, 1907	OCT. 13, 1913
			MAY 25, 1907.	
			JULY 1, 1907.	
			JULY 18, 1907.	
			AUG. 5, 1907.	
			OCT. 22, 1907.	
			APRIL 1, 1908.	
			JULY 1, 1908.	
			SEPT. 12, 1908.	
			OCT. 20, 1908	
			JAN. 4, 1909.	
			FEB. 23, 1909.	

15 PDR. BARBETTE CARRIAGE
MODEL OF 1903
LEFT SIDE AND REAR VIEW.

JAN. 26, 1904.

SUBMITTED:
CAPTAIN ORDNANCE DEPARTMENT, U. S. A.

EXAMINED:
T. C. Dickson
CAPTAIN ORDNANCE DEPARTMENT, U. S. A.

APPROVED:
William Crozier
BRIG. GEN., CHIEF OF ORDNANCE, U. S. A.

CLASS 5 | DIVISION 15 | DRAWING 2 | FILE

YC 64333

Gaylord Bros.
Makers
Syracuse, N. Y.
PAT. JAN. 21, 1908

1365275
U.C.

UF613
A6
3in E
1917

UNIVERSITY OF CALIFORNIA LIBRARY